

# Research Scanning Polarimeter (RSP) SPN Cirrus Mask

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## 1. Introduction

These files contain a simple mask to identify contamination of the RSP data by cirrus (or other clouds/aerosols) above the P3B aircraft.

The mask is derived from the upward looking SPN instrument operated by Sebastian Schimdt (U. Colorado). Data has been processed using code developed by Sebastian Schimdt and refined by Snorre Stamnes (NASA LaRC). Data has been collocated with RSP L1C and CLD files by Bastiaan van Dienenhoven.

## 2. Data contents and usage

Files are compatible with CAMP2EX-RSP1-L1C\_P3B and CAMP2EX-RSP1-CLD\_P3B HDF5 files. The variables “Collocated\_Latitude”, “Collocated\_Longitude”, and “Product\_time\_seconds” are identical in name and content to variables in the L1C and CLD files.

SPN\_PROXY\_OPTICAL\_DEPTH\_860 is a proxy optical depth of any particulate matter (cirrus and liquid clouds and aerosols) above the P3B aircraft. It is derived from SPN measurements at 860 nm using the assumption that the direct solar input to the SPN is attenuated as prescribed by the Lambert-Beer law. In general, this assumption would not lead to an accurate estimate of optical depth. Hence, it should be treated as a proxy value relevant for usage of flagging cirrus contamination.

T\_DIRECT\_BEAM\_TRANSMITTANCE is the direct beam transmittance estimated from the SPN measurements. It is not corrected for instrument field of view and should also be treated as a proxy value.

CIRRUS\_MASK is a binary cirrus mask derived from SPN\_PROXY\_OPTICAL\_DEPTH\_860 T\_DIRECT\_BEAM\_TRANSMITTANCE. Measurements are assumed to be contaminated by cirrus if the proxy optical depth exceeds 0.04 and transmittance is below 0.2. CIRRUS\_MASK= 0 for contaminated measurements, CIRRUS\_MASK= 1 elsewhere.

## Appendix: data structure and variables

```
group    /
dataset  /CIRRUS_MASK
dataset  /Collocated_latitude
dataset  /Collocated_longitude
dataset  /PRODUCT_TIME_SECONDS
dataset  /SPN_PROXY_OPTICAL_DEPTH_860
dataset  /T_DIRECT_BEAM_TRANSMITTANCE_860
```